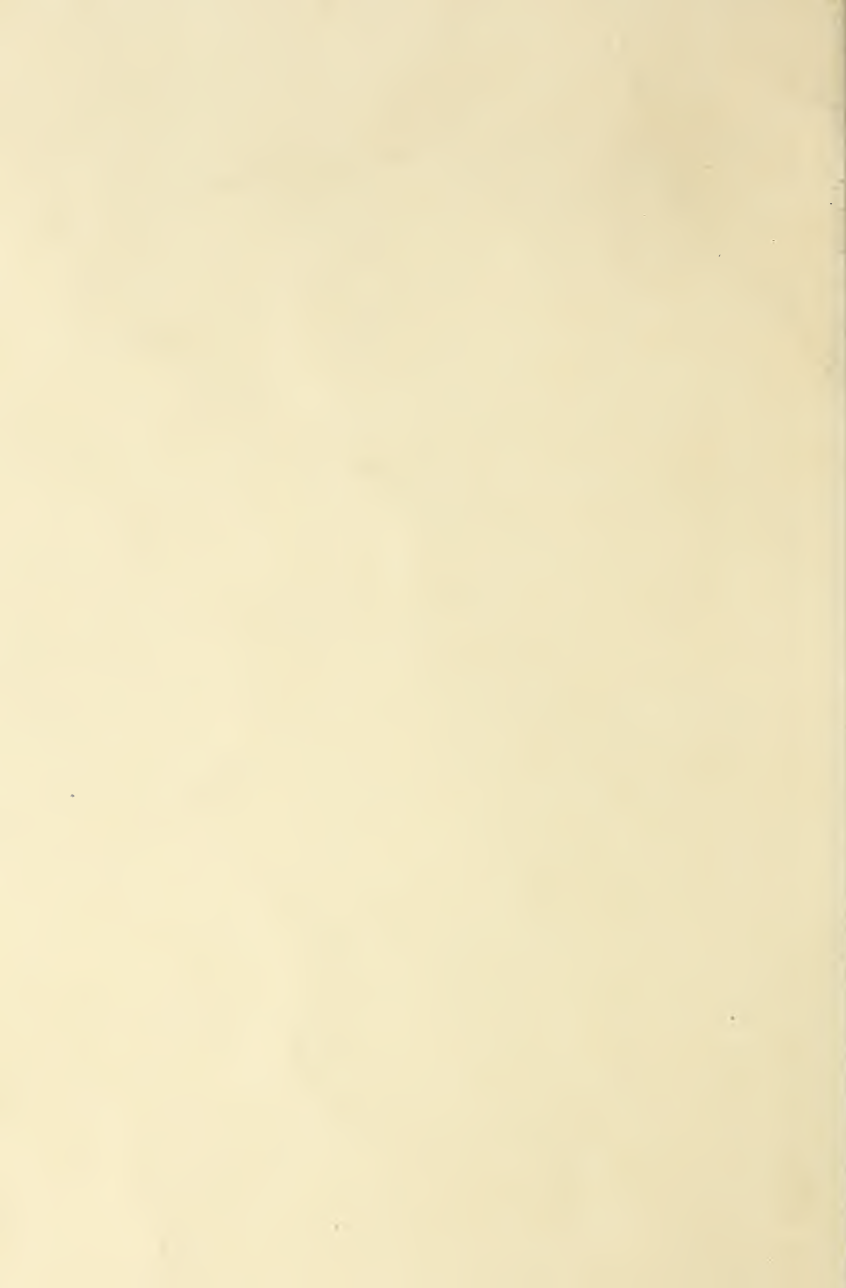


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THE COW TESTER'S HANDBOOK

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WASHINGTON, D. C.

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QUALIFICATIONS OF THE COW TESTER



The tester must be well trained for his work, since much of it requires considerable knowledge and skill.

He should have been brought up on the farm or lived some time on a dairy farm.

He should have had some technical training in an agricultural college; he must understand the Babcock test and have knowledge of the feeding and general care of dairy cattle.

Also he must be the type of man that wins the respect and confidence of those with whom he comes in contact.

In short, he must be an energetic leader, well prepared for that particular field of work.

THE COW TESTER'S HANDBOOK

By J. C. McDOWELL, *Senior Dairy Husbandman*

Revised by J. E. DORMAN, *Senior Dairy Husbandman*, and J. B. PARKER, *Extension Dairyman, Bureau of Dairy Industry*

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PURPOSE OF DAIRY-HERD-IMPROVEMENT ASSOCIATIONS

A dairy-herd-improvement association as ordinarily conducted in the United States is an organization of about 26 dairy farmers who cooperatively employ a trained tester to test their cows for economical production of milk and butterfat. The tester spends one day a month on each farm and while there gets for each cow in the herd a complete record of milk and butterfat production, feed consumption, feed cost, gross income, and income over feed cost. Using these records as a guide, the farmer and the tester figure out better methods of feeding, care, and management; they eliminate all cows that do not respond profitably to intelligent feeding; and they give careful attention to problems of breeding.

GENERAL PLAN OF WORK¹

The tester visits each farm once a month but not always on the same day of the month. Usually he arrives early in the

¹ The work of the tester, as explained in this handbook, is based on the uniform rules adopted by the American Dairy Science Association. These rules are given in the appendix.

afternoon and remains until about the same time the following day. By actual weight (fig. 1) he determines the quantity of grain fed to each cow night and morning; and by actual weight, or from estimates based on actual weight, he determines the quantity of roughage, both dry and succulent, consumed during the 24-hour period by each cow in the herd. With the help of the farmer he also estimates the value of the pasture. He weighs the milk of each cow night and morning (fig. 2), thoroughly mixes the milk of each milking (fig. 3), takes a sample

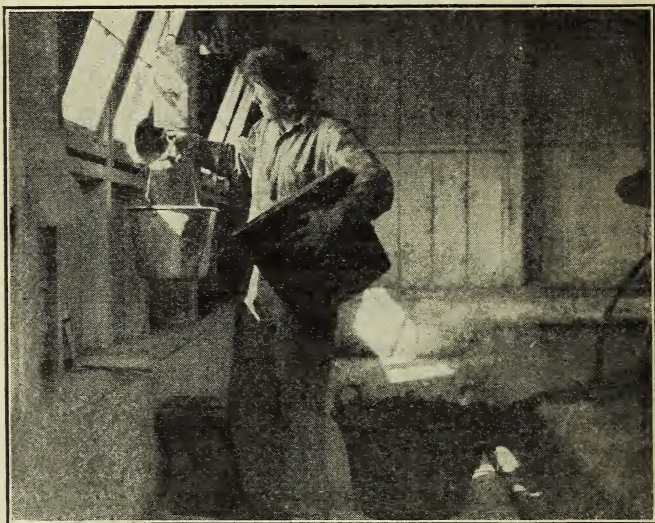


FIGURE 1.—Weighing the grain

(fig. 4), adds the morning sample to the night sample, and during the forenoon of the second day determines the percentage of butterfat in this composite sample by means of the Babcock test.

Besides his regular salary, the tester is furnished with board and lodging. In some associations he provides his own transportation. In the best organized dairy-herd-improvement associations the tester is paid by the association treasurer, who collects the money from the farmers. It is not advisable that the tester collect his salary from the individual farmers.

BLANKS USED

Four printed forms supplied at present by the United States Department of Agriculture are used in dairy-herd-improvement-association work. Some States require the filling out of additional blanks. The four department forms are as follows: Barn book, B. D. I. 2; herd record book in five sizes—12-cow, B. D. I. 63; 20-cow, B. D. I. 5; 30-cow, B. D. I. 6; 40-cow, B. D. I. 7; and 60-cow, B. D. I. 8; monthly association summary, B. D. I. 4 and 9; and yearly individual cow-report blank, B. D. I. 46. These forms will be supplied only to the States which cooperate with the department by furnishing copies of the individual cow records on Form B. D. I. 46 attached to inside back cover of the herd record book. Comparing the other forms with the forms used in ordinary bookkeeping, the barn book may be considered as the daybook, the herd record book as the ledger, and the monthly association summary sheet as the monthly report of progress. The yearly individual cow-report blank is the yearly report of each cow's production, feed cost, value of product, and income over feed cost.

BARN BOOK

The barn book consists of a filler pad of 100 sheets which are detachable, perforated near the top, each sheet accommodating records for 16 cows. Loose-leaf binders are supplied with the fillers.

Copying and computing records.—The number and name of each cow and her production, feed, and feed-cost records are written with pencil on one sheet of the barn book, a carbon copy being made on another sheet of the book at the same time if required by the State dairy specialist. Computations are then made for the monthly testing period by multiplying daily production, etc., by the number of days in the testing period and the results are recorded in the barn book. The testing day, which is the day on which the last sample of milk is taken, is considered as the middle of the monthly testing period. This period contains the same number of days as the calendar month in which it occurs, but the two periods coincide only when the testing day is in the middle of the calendar month. The method for centering the testing day is given on page 17.

Cow's number.—In the first column of the barn book the tester writes the herd numbers of the cows. Each cow must have the same herd number throughout the testing year. If, for any reason, a cow is eliminated from the herd, no other cow should be given that number until the records for that testing year are complete; and even then it is better not to repeat a

number for several years. If two cows were given the same number their records might be confused.

Cow's name.—In the second column of the barn book the tester writes the names of the cows.

Milk weights.—In the third column a double space is provided for recording separately the weights of two milkings. The night's milk of each cow is recorded above the dotted line and the morning's milk is recorded below. These weights are written in pounds and tenths of pounds. If all or any part of a cow's milk is lost the tester will use the average production of

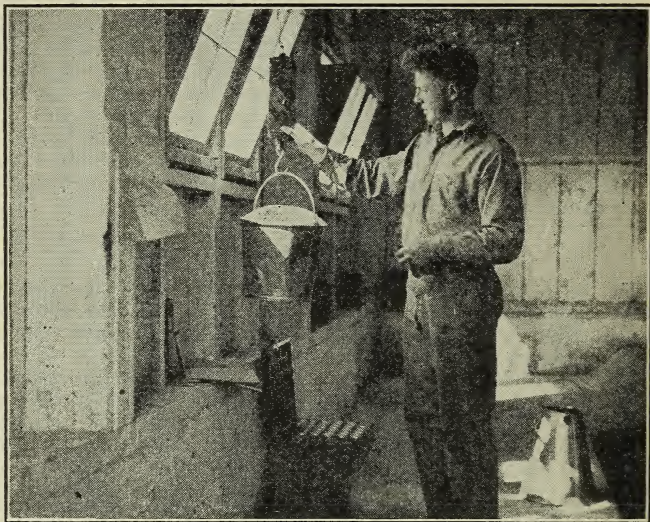


FIGURE 2.—Weighing the milk

the preceding and following months. To enable him to complete the work before leaving the farm he may use the production of the preceding month after deducting 10 per cent because of advance in lactation period. No deduction, however, need be made from the figures for the first month of the lactation period as the production of the second month is likely to equal that of the first month after the cow freshens. These estimated figures should be placed in the herd record book in pencil and entered in ink the following month, after the tester has been able to check with the actual production of the preceding and following months.

In the column headed "Total of day's milk," the tester writes the sum of the weights of the two milkings as computed from the preceding column.

In the column headed "Month's milk," the tester writes the computed number of pounds of milk produced by each cow during the monthly testing period.

If a cow is almost dry at the time of the tester's visit, the farmer and the tester may estimate the date when she will actually go dry and figure her monthly production record ac-

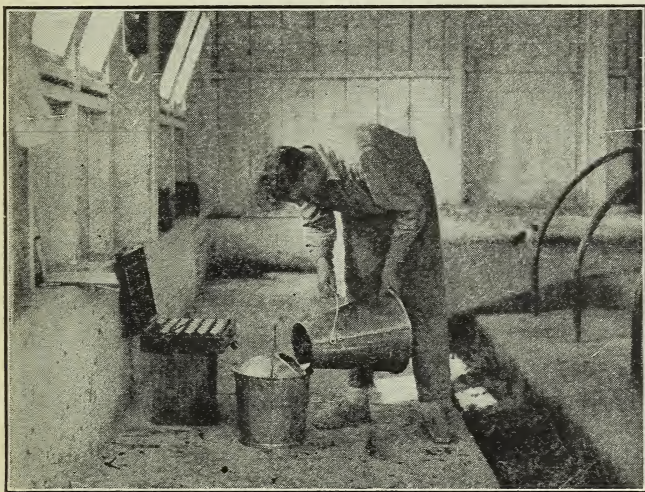


FIGURE 3.—Mixing the milk of each milking before taking sample

cordingly. By doing this the tester may complete all records before he goes on to the next farm. Under most circumstances it is best that the monthly record of each cow be completely filled out in the barn book and in the herd record book for that testing period at the time of the tester's visit and that no items be left to be computed on the occasion of his next visit. (Fig. 5.)

● **Computing the butterfat.**—After finding the butterfat test by means of the Babcock test, the tester writes the result in the column marked "Per cent butterfat." Then in the column marked "Pounds butterfat" he writes the product obtained by multiplying the month's milk by the butterfat test.

Price and value of product.—The price of product is written in the next column, and the tester should indicate whether the

price is for milk or butterfat. The average price actually received during the monthly testing period is used, regardless of whether or not the price is uniform throughout the association. According to the rule on page 20, it is to be the f. o. b. farm price. If this price can not be determined accurately, it should be estimated as accurately as possible. When milk is sold for so much a gallon, the gallons should be converted into pounds and the price computed at so much per hundred pounds. A gallon of milk weighs approximately 8.6 pounds.

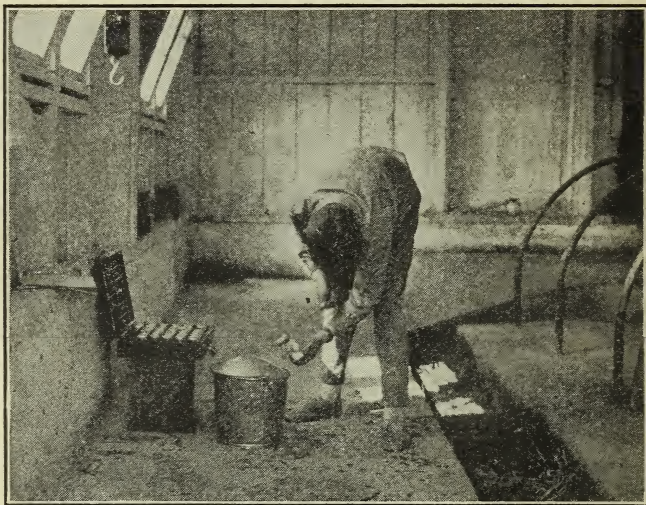


FIGURE 4.—Taking milk sample to be tested for butterfat

In the following column the tester writes the value of the product for the month. This is obtained by multiplying the pounds of butterfat or the pounds of milk by the price received.

Quantity of feed.—Under the heading "Daily and monthly feed amounts" the tester writes the quantity of each kind of feed given each cow daily and the quantity fed each cow during the monthly testing period.²

² The prices of home-grown feeds of the same quality should be uniform throughout the association. In some associations the prices used as a basis for figuring feed records are fixed by a committee. The committee meets at certain times of the year and estimates the feed values of home-grown feeds for a definite period. These estimates include pasture and silage. If there is no committee on feed prices, the prices may be determined by the tester and the farmer.

Cost of roughage, etc.—Under “Cost of roughage, including pasture,” the tester writes the cost of pasture and other roughage for the monthly testing period. In like manner, under each of the next four items, “Cost of grain,” “Total cost of feed,” “Value of product above feed cost,” and “Value of product below feed cost,” the tester writes the figures for the monthly testing period. On the back of the barn-book sheet the tester is expected to keep feed and improvement records as indicated.

Remarks.—Under “Remarks” the tester may write such items as date of freshening, date dry, date purchased, and date sold.

Monthly herd totals.—After all computations have been made and the monthly individual cow records in the barn book are complete, the herd total for the month is obtained on the barn book sheet by adding the monthly individual cow records.

HERD RECORD BOOK

The herd record book is a bound book designed to include individual monthly records of cows for a year, or full testing period. It is made in various sizes for 12, 20, 30, 40, and 60 cows, to suit large or small herds. At the beginning of the book space is provided for the monthly herd summary, and at the end for the yearly summary. Space is also provided for pedigrees of the herd sires and a gestation table. The reports for the Bureau of Dairy Industry are attached at the back of the herd record book.

When the barn-book record has been completed for the month, the total for the herd and the figures for each cow are transferred by the tester to the herd record book. The barn book remains in the possession of the tester, and the herd record book remains in the possession of the farmer.

In transferring the monthly milk weights from the barn book to the herd record book, tenths of a pound may be omitted. In omitting tenths it is customary to use the nearest whole number. For example, 725.4 is recorded as 725 and 725.6 as 726. When the fraction is exactly one-half, it is customary to use the nearest even whole number; for example, 724.5 is recorded as 724 and 725.5 as 726.

The percentage of butterfat is read to the first decimal place. The butterfat production for the month is written in pounds and tenths of a pound.

Tester's first visit.—On the tester's first visit to the farm of a member of the dairy-herd-improvement association he should, as far as possible, fill in the blanks at the top of the individual cow record pages of the herd record book. Unless this is filled in no comprehensive study can ever be made of the work of these associations, and no farmer and no tester can satisfactorily

make a study of the records of even a single herd. (Fig. 6.) To be sure, the farmer and the tester may know the breed, age, weight, and date of freshening of a cow, and they may know the records of the dam, but unless such records are in written form they are not in condition for study. For example, the farmer would like to know whether the daughter of a certain cow is producing as much as her dam, in order that he may know the true value of the sire and whether or not his herd is advancing in production. The easiest way to make this comparison is to have the records of the dam and daughter and the

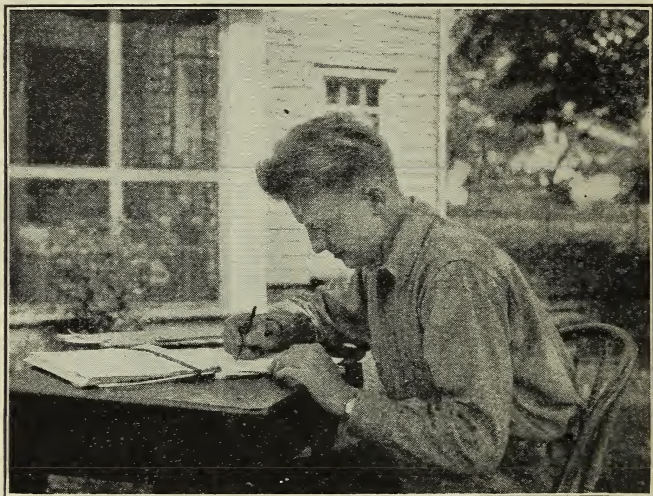


FIGURE 5.—The tester figures results before leaving the farm

name of the sire of the daughter recorded on a single page of the herd record book.

Even if the farmer and the tester do not make a thorough study of the data, there can be no question that if a thorough study of the records is to be made by the State college of agriculture or by the United States Department of Agriculture the completely filled out records are essential. Such records require but little more time on the part of the tester than those partly filled out, because the items asked for at the top of the page are filled out only once a year and require practically no computation, whereas the records of feed and production must

be filled out once a month and require considerable computation. Probably the difference between making the records complete and making them in the way the most careless of testers do would amount to less than 2 per cent of the total time involved.

Information desired.—At the top of the page in the herd record book the tester writes the name and herd number of each cow, her breed, age, weight, date fresh before the testing year began, date bought if she has been purchased, the date when the testing year began, the name and herd number of the cow's dam, the dam's dairy-herd-improvement-association rec-

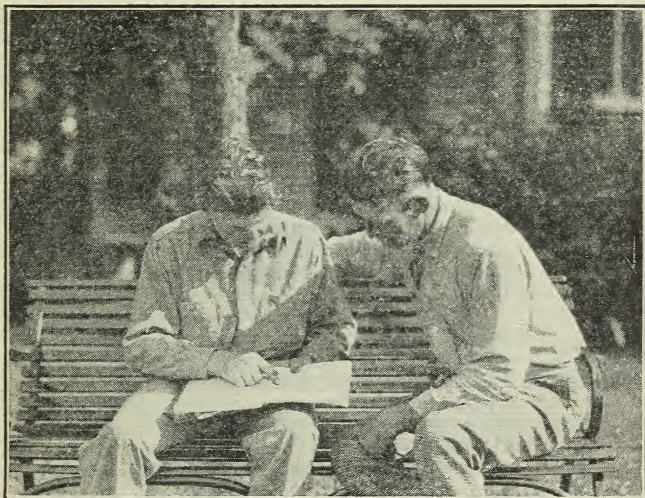


FIGURE 6.—The tester and the farmer study the figures

ord of production of milk and butterfat if such record is available, the age when dam was tested, a statement as to whether dam is purebred, grade, or scrub, the name and registration number of the cow's sire, and a statement as to whether or not he is purebred. If the sire is a bull-association bull, that fact should be noted in the record.

The age when the cow freshened should be given in years and months. The cow's weight may be her actual weight or her weight as estimated by the tester or by the farmer.

Most of the other items in the heading can not be filled in at the tester's first visit. As the data become available, however,

the tester writes in the heading the date when the testing year ended; the number of months the cow was on test, which is the sum of both the dry period and the number of months in milk; the date when she went dry; the date when she freshened during the testing year; and, in case the cow is no longer in the herd, the date when she died or was sold.

Be definite about breed.—In filling out headings everything should be so clearly written that it can not be misunderstood. For example, under "Breed" it is not enough to write the word "Jersey," "Guernsey," "Holstein," or "Ayrshire," because to some people those terms mean purebred and to others they mean grade. One cow tester may say, "I don't see how anybody can misunderstand me, because when I write Jersey I always mean a registered purebred Jersey." Another may say, "I don't see how anybody can misunderstand me, because when I write Jersey I always mean grade Jersey." Under all circumstances the tester should indicate whether the animal is a grade or a purebred of that respective breed. This can be done by using the abbreviations Gr. for grade and R. for registered.

Record of cow's dam.—The record of the cow's dam, as given in the third and fourth lines of the heading of the individual cow record, should be a dairy-herd-improvement-association record unless otherwise stated. If a record is from advanced registry, the tester should indicate it in such a way that the record can not be mistaken for a dairy-herd-improvement-association record. Only records of the same kind can be compared. It is quite possible that the dam may make a dairy-herd-improvement association record the very same year that her daughter does. Under such circumstances the tester will simply include on the daughter's yearly-record page the record of the dam as found in the herd record book for that same year.

The tester must be very careful to give the age of the cow and her dam in years and months, because it is not fair to compare the record of an immature cow with the record of a mature cow. In comparing records of dams and daughters it is often necessary to make allowance for age, and to do this as it should be done the age must be known to the fraction of a year.

Breed of sire.—The cow's sire should be mentioned by name and number. Usually this will tell whether or not he is registered, but to make the record clear the tester should fill in the item of the heading that asks the breed of sire. The sire referred to here is the sire of the cow under test and not the sire of the dam.

Tester's second visit.—On the tester's second visit to the farm he will copy the second month's record for each cow into the barn book and from the barn book into the herd record book; then he will add the record of the first and second months

and get the "Total to date," which is placed on the third line (a dotted line) of the individual cow-record page in the herd record book. Each subsequent total to date comes on a dotted line. Some testers write these totals in red ink, which is a very good practice. The tester fills in the individual-cow record month by month and writes the totals to date each month until the end of the year, at which time he has a complete yearly record of each cow in each herd of the association.

Remarks.—Under the heading "Remarks" the tester may write events as they occur. For example, when the cow is bred he may record the date in the barn book and herd record book under "Remarks" for that month. Time may be saved, however, by writing the dates when the cow freshened and went dry in the heading of the herd record book without having previously written them under remarks. In the herd record book, at the foot of each page space is allowed for the record of calves born during the year, description or distinguishing features of the cow, her previous record, and the general summary for the year. A page is included in the herd record book for services of the herd sire. If the member will enter each service on that page, the tester will have the necessary breeding information to enter on the individual cow-record page upon each monthly visit. Each of these items is self-explanatory and no great amount of work is required to fill them out completely.

Monthly herd summary.—The monthly herd summary is made up first in the barn book by simply adding the different items and writing the totals after the word "Total" at the foot of the page. This summary is then copied into the herd-book on the monthly herd-summary pages. If thought best this summary may be given in two forms: (1) As the grand total of production, feed cost, etc., and (2) as the average production, feed cost, etc., of all the cows in the herd. For convenience the totals may be written in black ink and the averages in red.

MONTHLY ASSOCIATION SUMMARY

The monthly association summary is a sheet about 17 by 11 inches in size, printed the same on both sides. The headings are the same as those of the monthly herd summary in the herd record book.

As the tester visits one farm each day he obtains one herd record, and this he records in the monthly herd summary of the herd record book. If his State agricultural college desires it, he may also copy each herd summary on the monthly association summary sheet and send that sheet to the college at the end of the month.

The monthly association summary sheet gives the total production and the average production of each herd for a month. It also gives the total and average production of all the cows in the entire association. As this sheet is self-explanatory and as the various items are similar to those of the other sheets that are fully explained in this publication, it is thought unnecessary to explain this sheet by items.

YEARLY INDIVIDUAL COW-REPORT BLANK

The individual cow-report blank is used by the tester to report the yearly record of each cow in every herd of his association. This form is attached to the inside back cover of the herd record book. When completed and removed from the book at the close of the testing year it is sent to the State college, which forwards it to the Bureau of Dairy Industry, United States Department of Agriculture, for tabulation and study.

Copying the records on the blank.—The records of the individual cows are copied directly without any changes from the pages of the herd record book. The first part of the yearly individual cow-report blank, which accommodates the records of 20 cows, gives the following information concerning the cows on test: Name and number of cow, breed, age, weight, freshening dates, months on test, months in milk, production of milk and butterfat, and feed consumption. The rest of the blank is for the dam and sire information. In this, only dairy-herd-improvement-association records should be used for the dam, and only the registry number need to be used for the sire. Spaces are provided at the top of the sheet for the full name, breed, and number of each sire represented by daughters in the herd. This form has been designed to eliminate as much writing as possible. It will be noted that for each sheet the owner's name, association, testing period, and names of feeds need be written only once. The records of all cows that have been on test at any time during the year are to be entered on this sheet. Figure 7 shows a completely filled out yearly individual cow-record report as sent in by a tester for tabulation.

BIMONTHLY TESTING

Bimonthly testing, or testing once in two months instead of once a month, is gaining in favor. A comparison of the records obtained from weighing and testing the milk of every milking throughout the year showed that in monthly testing the average error was about 2 per cent for milk and 3 per cent for butterfat and in bimonthly testing the average error was about 3 per cent for milk and 4 per cent for butterfat.

Bimonthly testing, therefore, is not quite so accurate as monthly testing but because it is a cheaper method many dairy-men prefer it to monthly testing. The work is identical with that of the regular associations except that the testing is done six times a year instead of twelve times a year.

APPENDIX

- * Uniform Rules for the Operation of the Dairy-Herd-Improvement Association (as adopted by the American Dairy Science Association)

STANDARD EQUIPMENT

All the equipment is to be owned by the dairy-herd-improvement association and should consist of the following:

1. Sixty-pound milk scale.
2. Babcock tester (24-bottle tester recommended).
3. Standard glassware as adopted by the American Dairy Science Association.
 - a. Thirty milk-test bottles.
 - b. Two pipettes.
 - c. One skim-milk-test bottle.
4. Acid measure or dipper.
5. Standard milk-sample graduate.
6. Twenty-four sample jars (4-ounce bottles).
7. Sample dipper.
8. Water bath.
9. Dairy thermometer.
10. Dividers.
11. Computing book (Smith's computer or Creller's Rechnetafeln).
12. Extra milk pail.
13. Test bottle and sample bottle brushes.
14. Lock and key.
15. Locked field box.
16. Commercial sulphuric acid, 1.82 specific gravity.

COWS ON TEST

All cows of milking age in the herd must be put on test. If not, all monthly and yearly publicity is to be withheld.

LOCKED SAMPLE CASES

At all times all milk samples and glassware must be kept under lock and key to prevent outside criticism and to assure reliable records.

METHOD OF SAMPLING

1. All weighing and sampling of milk must be done by the tester.

2. The milk should be thoroughly mixed by pouring it into another pail and stirring it.

3. The composite sample shall consist of proportionate amounts of each milking.

APPLYING THE BABCOCK TEST

The Babcock test shall be applied according to the following rules of the American Dairy Science Association:

Milk samples.—Composite samples should be kept in clean jars, sealed air-tight, containing a sufficient amount of preservative. Corrosive sublimate, potassium bichromate, and formaldehyde are satisfactory preservatives.

Immediately before testing, the sample is thoroughly mixed until it is homogeneous. If lumps of cream, butter, or ice do not completely disappear, it should be heated to 100°–120° F., mixed thoroughly, and pipetted at once. The incorporation of air bubbles while the sample is being mixed should be avoided. Curdy and churned samples are not dependable.

Testing.—The composite sample of milk is to be tested as follows: Measure 18 grams of milk from properly mixed sample into standard milk-test bottle by using 17.6 c. c. standard pipette, add 17.5 c. c. of standard commercial sulphuric acid, shake until all curd has disappeared, and then continue the shaking for a few moments longer. Milk and acid before mixing should have a temperature of 50° to 70° F.

Whirl in Babcock centrifuge for 5, 2, and 1 minutes, respectively, filling the bottle with hot soft water to the bottom of the neck after the first whirling and to near top graduation after the second whirling. The temperature of the water should be 140° F. or above. The proper speed of the centrifuge is 800 revolutions per minute for an 18-inch diameter wheel and 1,000 revolutions per minute for a 12-inch diameter wheel.

Set the test bottles into water bath so that the entire butterfat column is surrounded and read after a temperature of 135° to 140° F. has been maintained for not less than three minutes. Read test by measuring butterfat column from bottom of lower meniscus to top of upper meniscus. Use dividers for reading.

COLOSTRUM MILK

When a cow freshens or goes dry, production is figured for the time the cow actually gave milk, except that in the case of freshening three days, including the freshening day, are deducted for colostrum. The milk should not be tested until the seventh day after calving. If this will be after the tester's visit, the next month's test shall be used in determining the production of this fractional period.

Twenty Individual Cow Report Blank

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF DAIRY INDUSTRY

U. S. D. 16

TESTS OF COWS IN YEARS

NAME	DATE	TEST
Quarter of Lincoln	12. 4. 1917	10. 1. 1917

Yellinstown, Dairy Herd Improvement Association, Iowa, State
 John Doe, Herd owner, Yellinstown, Iowa, January 29, 1917

Name and number of cow	COWS IN HERD ON TEST				FIELD DURING TESTING PERIOD				FEED CONSUMED DURING TESTING PERIOD				CONCENTRATES				DAIRY AND SIZE OF COW AT TEST			
	Breed	Age	Weight	Height and hind quarters	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking	Feeding and milking
Dempsey	16.5	900	716	49 1/2	12/11	747	125	41	331	413	123	71	300	530	6790	110	110	110	110	110
Lincoln	16.3	900	744	49 1/2	12/12	155	71	340	41	61	40	300	530	6790	110	110	110	110	110	110
Butter	16.2	800	744	49 1/2	12/12	175	61	309	41	71	21	300	530	6790	110	110	110	110	110	110
Patty	16.4	1000	744	49 1/2	12/12	156	21	333	41	31	01	300	530	6790	110	110	110	110	110	110
Reggie	16.2	800	744	49 1/2	12/11	199	41	267	41	51	01	300	530	6790	110	110	110	110	110	110
Florida	16.3	850	744	49 1/2	12/11	712	41	370	41	10	71	300	530	6790	110	110	110	110	110	110
Swan	16.3	850	744	49 1/2	12/11	690	41	306	41	71	01	300	530	6790	110	110	110	110	110	110
Belle	16.9	1100	744	49 1/2	12/11	755	41	333	41	31	01	300	530	6790	110	110	110	110	110	110
Dot	16.2	800	744	49 1/2	12/12	162	31	326	41	61	31	300	530	6790	110	110	110	110	110	110
Mary	16.2	800	744	49 1/2	12/11	98	41	333	41	71	21	300	530	6790	110	110	110	110	110	110
Salby	16.2	850	744	49 1/2	12/11	605	41	346	41	71	21	300	530	6790	110	110	110	110	110	110
Lady	16.2	850	744	49 1/2	12/11	524	41	353	41	307	41	300	530	6790	110	110	110	110	110	110
Jackie	16.2	850	744	49 1/2	12/11	627	41	306	41	51	01	300	530	6790	110	110	110	110	110	110
Nick	16.3	900	744	49 1/2	12/12	696	41	342	41	307	41	300	530	6790	110	110	110	110	110	110
Debbie	16.3	850	744	49 1/2	12/12	779	41	340	41	51	01	300	530	6790	110	110	110	110	110	110
Sammy	16.7	1000	744	49 1/2	12/11	714	41	340	41	312	41	300	530	6790	110	110	110	110	110	110
Charles	16.2	850	744	49 1/2	12/11	111	107	31	400	51	01	300	530	6790	110	110	110	110	110	110
Daisy	16.2	850	744	49 1/2	12/11	96	41	305	41	312	41	300	530	6790	110	110	110	110	110	110
	16.2	850	744	49 1/2	12/11	9	41	306	41	312	41	300	530	6790	110	110	110	110	110	110

FIGURE 7.—Yearly individual cow-record report completely filled out

RETEST

1. When milked twice per day cows producing at the rate of 2.5 or more pounds butterfat per day for the regular monthly testing period are to be retested during the 24 hours following the first test.
2. When milked three or four times per day cows producing at the rate of 3 or more pounds butterfat per day for the regular monthly testing period are to be retested during the 24 hours following the first test.
3. When a herd averages 50 or more pounds butterfat per month per cow in milk, a retest is to be conducted during the 24 hours following the first test.
4. Retests are to be conducted by the local cow tester or tester designated by the State supervisor in charge of dairy-herd-improvement associations. When a retest is made the average of the original test and the retest is to be used in figuring the final record.
5. The cost of the retest is to be paid by the owner of the cow. The cost shall not be more than the prevailing rate schedule in use in the association.
6. If the owner does not consent to pay for a retest all publicity on the cow is to be withheld, and the records are not to be included in the monthly and yearly herd and association summaries.

CALVES ON COWS

When the cow is nursing the calf, feed cost should be charged. No milk samples are to be taken until the subsequent testing day after the calf has been removed. Weights and tests obtained at that time should be used in figuring back production, excluding colostrum milk.

MILK SHEET

The milk sheet³ is for the farmer's use and enables him to keep milk-production and feed records up to date at all times.

TESTERS USE THEIR OWN FIGURES

Testers shall use their own production figures of the testing day as the average for the monthly testing period.

³ The bureau has discontinued the distribution of the milk and feed record sheets but many States print their own supplies of this form.

METHOD FOR CENTERING THE TESTING DAY ⁴

The testing period has the same number of days as the calendar month in which the testing day occurs. Considering the testing day as the middle of the testing period gives each herd a different testing period. If the testing day of a certain herd is on the first day of the month, the monthly testing period for that herd extends from the middle of the preceding month to the middle of the current month. If the testing day is in the middle of the calendar month, the monthly testing period and the calendar month coincide. If the testing day is the last day of the month, the monthly testing period extends from the middle of that month to the middle of the following month.

TABLE 1.—*Testing period as centered on each testing day of every month*

Testing day ¹	January, August (31 days)	February (28 days)	March (31 days)	April, June, September, November (30 days)	May, July, October, December (31 days)
1.....	² 17 to 16	² 17 to 13	² 14 to 16	² 17 to 15	² 16 to 16
2.....	² 18 to 17	² 18 to 14	² 15 to 17	² 18 to 16	² 17 to 17
4.....	² 20 to 19	² 20 to 16	² 17 to 19	² 20 to 18	² 19 to 19
6.....	² 22 to 21	² 22 to 18	² 19 to 21	² 22 to 20	² 21 to 21
8.....	² 24 to 23	² 24 to 20	² 21 to 23	² 24 to 22	² 23 to 23
10.....	² 26 to 25	² 26 to 22	² 23 to 25	² 26 to 24	² 25 to 25
12.....	² 28 to 27	² 28 to 24	² 25 to 27	² 28 to 26	² 27 to 27
14.....	² 30 to 29	² 30 to 26	² 27 to 29	² 30 to 28	² 29 to 29
15.....	² 31 to 30	² 31 to 27	² 28 to 30	² 31 to 29	² 30 to 30
16.....	1 to 31	1 to 28	1 to 31	1 to 30	1 to 31
17.....	2 to ³ 1	2 to ³ 1	2 to ³ 1	2 to ³ 1	2 to ³ 3
18.....	3 to ³ 2	3 to ³ 2	3 to ³ 2	3 to ³ 2	3 to ³ 2
20.....	5 to ³ 4	5 to ³ 4	5 to ³ 4	5 to ³ 4	5 to ³ 4
22.....	7 to ³ 6	7 to ³ 6	7 to ³ 6	7 to ³ 6	7 to ³ 6
24.....	9 to ³ 8	9 to ³ 8	9 to ³ 8	9 to ³ 8	9 to ³ 8
26.....	11 to ³ 10	11 to ³ 10	11 to ³ 10	11 to ³ 10	11 to ³ 10
28.....	13 to ³ 12	13 to ³ 12	13 to ³ 12	13 to ³ 12	13 to ³ 12
30.....	15 to ³ 14	-----	15 to ³ 14	15 to ³ 14	15 to ³ 14
31.....	16 to ³ 15	-----	16 to ³ 15	-----	16 to ³ 15

¹ Day of the month on which the first test of the association year was made.

² Date of the previous month.

³ Date of the following month.

For instance, if the test is made on March 16, the testing period is the month of March, with 31 days. If the testing day is March 31, the testing period is 31 days—from March 16 to April 15, inclusive. If the testing day is April 1, the period

⁴ Table 1, which was prepared by the dairy extension specialists of Illinois, shows the testing period as centered on each testing day of every month.

is 30 days—from March 17 to April 15, inclusive. If the testing day is April 16, the period is the month of April—30 days.

When a cow freshens or goes dry there will usually be a fractional month for which production must be figured. If a cow freshens on March 2 and the next testing day is April 1, three days are allowed for the milk to become normal, and the production is figured from March 5. In this case the fractional month extends from March 5 to March 16, inclusive, and in computing production for that period the milk weights and the test of April 1 are used. The remainder of the testing period, namely, from March 17 to April 15, is calculated as in the preceding paragraph. Feed weights, however, are figured for the entire monthly period that centers on April 1; and for this cow, as well as for all other cows in the herd, the feed weights for April 1 are used in making the computations. If the testing day is April 1 and the cow goes dry on April 30, the testing period that centers on April 1 extends from March 17 to April 15, inclusive, as stated in the preceding paragraph. This leaves a fractional testing period from April 16 to April 30, inclusive. For this period the milk weight and test of April 1 must be used, but the feed weights of May 1 are used to cover the entire monthly period that centers on May 1.

It is desirable that the testing year begin at or near the beginning of a calendar month, so that the tester can make a round of the association within each calendar month. The monthly testing period is given the name of the calendar month in which the testing day occurs.

If the cow freshens at such a time during the last testing month at the end of the association year that she can not be credited on the last regular visit of the tester, the books may be kept open until the first regular visit of the next year and completed at that time. In case the member does not continue in the association he may pay for the extra visit necessitated to complete this record, or the cow shall be considered as dry and the books closed.

LOST SAMPLES AND ABNORMAL TESTS

In case of lost samples or abnormally low or high test due to abnormal conditions, the average of preceding and following tests should be used. In the case of fresh cows, if the sample is lost or test is abnormal, the following month's test should be used.

DOUBLING HERDS

The practice of doubling herds is discouraged. If it is done it must be passed on by the State supervisor in charge of dairy-herd-improvement associations. At all times the samples must be taken by the tester.

MONTHLY HERD AVERAGES

In calculating the monthly herd average for the monthly herd summary the total number of cows in the herd, including the dry cows and heifers just freshened, must be included.

YEARLY HERD AVERAGES

The cow-year method is to be used in figuring the yearly herd average. This method is as follows:

Month	Cows in milk	Cows dry	Cows in herd	Remarks
January.....	12	2	14	Sold 1 cow. Purchased 3 cows.
February.....	14	0	14	
March.....	13	0	13	
April.....	15	1	16	
May.....	15	1	16	
June.....	16	0	16	
July.....	16	0	16	
August.....	12	4	16	
September.....	11	5	16	
October.....	14	2	16	
November.....	16	0	16	
December.....	16	0	16	
Cow-months, 185				

The average number of cows in this herd for the year is $185 \div 12 = 15.41$. When properly kept, the monthly herd summary sheet in the herd record book will give all information needed to use this method of figuring the herd average. When the entire quantity of milk and butterfat for each month, as shown on the summary page, is used as the total, the exact quantity of milk and butterfat shall be included. When the number representing the average number of cows ends in a fraction it should be carried out to two decimal places.

In some cases testers do not find it convenient to add back credits on the monthly herd summary page. In such cases an accurate yearly herd average may be calculated from the yearly summary page at the back of the herd book. The cow years may be calculated by adding the column "months on test" and dividing by 12.

The herd average for milk, butterfat, and other items can be determined by dividing the totals for the year by the average number of cows in the herd, according to the above method.

All cows that have been on test in the herd during the year, regardless of the length of time, are to be included in the herd average.

YEARLY PRODUCTION AVERAGE FOR THE DAIRY-HERD-IMPROVEMENT ASSOCIATION

The yearly production average for the dairy-herd-improvement association is to be derived as follows: Total all the milk and butterfat produced by all the herds in the association and divide this by the total number of cow years.

PRICES OF FEED

All home-grown feeds, including silage, hay, and grain, should be figured on the valuation of these on the farm when fed. The price of silage is the value of silage in the silo; of hay, the value of the hay in the mow; and of grain, the value of grain in the barn. Purchased feed should be figured on the basis of prices paid.

VALUE OF PRODUCT

The value of the product shall be based on an f. o. b. farm price.

SKIM MILK

If milk is separated, the skim milk shall be credited to the cow. The value of the skim milk is to be determined in each State by local conditions. Eighty-five per cent of the whole milk produced by the cow is to be considered as skim milk. The valuation of skim milk is to be included in the column "Value of product" in the dairy-herd-improvement-association herdbook.

CLASSIFICATION OF HERDS

For monthly and yearly herd averages, the herds shall be classified according to the following sizes:

Small herds—below 5 cows.

Medium herds—5 to 15 cows.

Large herds—above 15 cows.

UNPROFITABLE COWS

No cow should be sold for dairy purposes if her dairy-herd-improvement-association record has shown her to be an unprofitable cow.

TEN SUGGESTIONS TO COW TESTERS

1. On the first trip make it a point to get acquainted. Favorable first impressions go a long way toward obtaining the cooperation that will help to make your services most useful.

2. Do not talk too much. Be a good listener. Be helpful, but do not put yourself forward.

3. Help, don't hinder. Do not hesitate to carry in an armful of wood or a bucket of water.

4. Spend the evening with the farmer and his family if it is convenient for them to have you do so. You can learn much from them and they may learn something from you.

5. Be pleasant and agreeable, but do not carry gossip.

6. Mix praise with helpful criticism in such a way that the farmer will gladly follow your advice. The best way is to lead up to an idea in such a manner that the farmer himself will be the first to mention the need and method of the improvement.

7. If the test of any cow is abnormal on the day of your visit, you may correct the records on your next visit by using the average production records of the month preceding and the month following the date of the abnormal test. This will insure accuracy.

8. So far as possible, complete the records and bring them up to date at each visit. If possible, fill out all records.

9. Promote cooperation among your farmers, but do not make yourself conspicuous. Be "the power behind the throne," but do not try to sit on the throne.

10. Publish favorable results and give each owner and each herd as much publicity as the facts will warrant.

